

Date: Monday, 6/5/2006 7:27:00 AM  
 User: Kim Johnston

## Process Sheet

|                       |                                     |                |                  |                    |  |
|-----------------------|-------------------------------------|----------------|------------------|--------------------|--|
| Customer              | CU-DAR001 Dart Helicopters Services |                | Drawing Name     | : ASPIRATOR        |  |
| Job Number            | : 27332                             |                |                  |                    |  |
| Estimate Number       | : 12425                             |                |                  |                    |  |
| P.O. Number           | : N/A                               |                | Part Number      | : D2000111         |  |
| This Issue            | : 6/5/2006                          | S.O. No. : N/A | Drawing Number   | : D2000-111 REV A1 |  |
| Prsht Rev.            | : NC                                |                | Project Number   | : N/A              |  |
| First Issue           | : N/A                               |                | Drawing Revision | : A1               |  |
| Previous Run          | : N/A                               |                | Material         | : N/A              |  |
| Written By            | : See Comment Below                 |                | Due Date         | : 7/29/2006        |  |
| Checked & Approved By | : RJ 06.06.05                       |                | Qty:             | Um: Each           |  |
| Comment               | : Est Rev:A New Issue 06-05-31 JLM  |                |                  |                    |  |

## Additional Product

Job Number:



| Seq. #: | Machine Or Operation: | Description :   |
|---------|-----------------------|---|
| 1.0     | PG                    | PURCHASING<br>  |
|         |                       | Comment: PURCHASING<br>Issue P/O: 1406 For D2000-111<br>Spin as per Dwg D2000-111<br>Possible Supplier: SIEG<br>Material release note is required<br>C 206/05/06 (10) |
| 2.0     | D2000111S             | Aspirator - Inner Core<br>  |
|         |                       | Comment: Qty.: 1.0000 Each(s)/Unit Total : 4.0000 Each(s)<br>Aspirator - Inner Core   |
| 3.0     | PACKAGING 1           | PACKAGING RESOURCE #1<br>   |
|         |                       | Comment: PACKAGING RESOURCE #1<br>Receive & Inspect For Transit Damage<br>Ensure material certification is attached<br>C 206/14/06 (10)                               |
| 4.0     | QC6                   | DIMENSIONAL CHECK<br>   |
|         |                       | Comment: DIMENSIONAL CHECK<br>J 06-06-14 (10)   |
| 5.0     | SMALL FAB 1           | SMALL & MEDIUM FAB RESOURCE 1<br>   |
|         |                       | Comment: SMALL & MEDIUM FAB RESOURCE 1<br>Drill as per Dwg D2000<br>Deburr<br>SAY 06:06:246 (10)  |

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                 |                          |
|------|------|--------------------|----|------|-----|---------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Mfg / Design<br>Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                 |                          |
|      |      |                    |    |      |     |                                 |                          |

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                  |                |                           |                        |                          |
|------|------|----------------------------------|-----------------------------|----------------------------------|----------------|---------------------------|------------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                  |                | Verification<br>Section C | Approval<br>Design Mgr | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Design Mgr       | Action Description<br>Design Mgr | Sign &<br>Date |                           |                        |                          |
|      |      |                                  |                             |                                  |                |                           |                        |                          |
|      |      |                                  |                             |                                  |                |                           |                        |                          |
|      |      |                                  |                             |                                  |                |                           |                        |                          |

Part No: \_\_\_\_\_

PAR #: \_\_\_\_\_

Fault Category: \_\_\_\_\_

NCR: Yes

 NoDQA: 

Date: 06/01/09

NOTE: Date &amp; initial all entries

QA: N/C Closed: \_\_\_\_\_

Date: \_\_\_\_\_

Date: Monday, 6/5/2006 7:27:00 AM  
User: Kim Johnston

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: ASPIRATOR

Job Number: 27332

Part Number: D2000111

Job Number:



Seq. #: Machine Or Operation:

Description :

6.0 QC5

INSPECT WORK TO CURRENT STEP



*Job 27332*

(10)

Comment: INSPECT WORK TO CURRENT STEP

7.0 PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location:

*6/06/28 (10)*

(10)

8.0 DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

*6/06/27*

(10)

Job Completion



*6/06/28*

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                 |                          |
|------|------|--------------------|----|------|-----|---------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Mfg / Design<br>Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                 |                          |
|      |      |                    |    |      |     |                                 |                          |

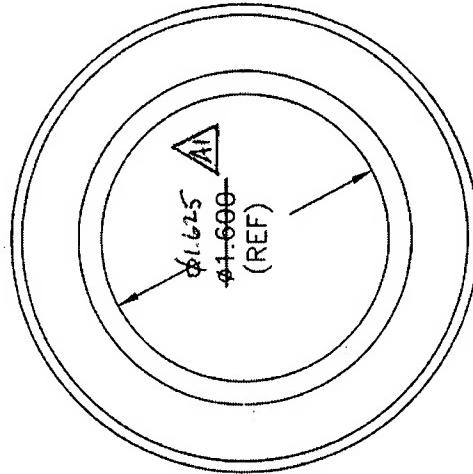
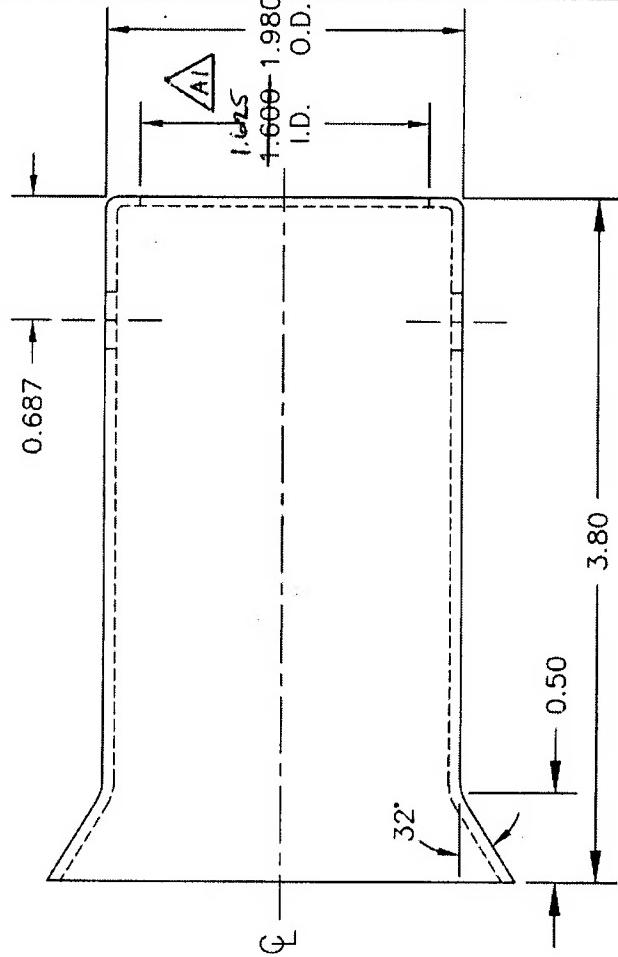
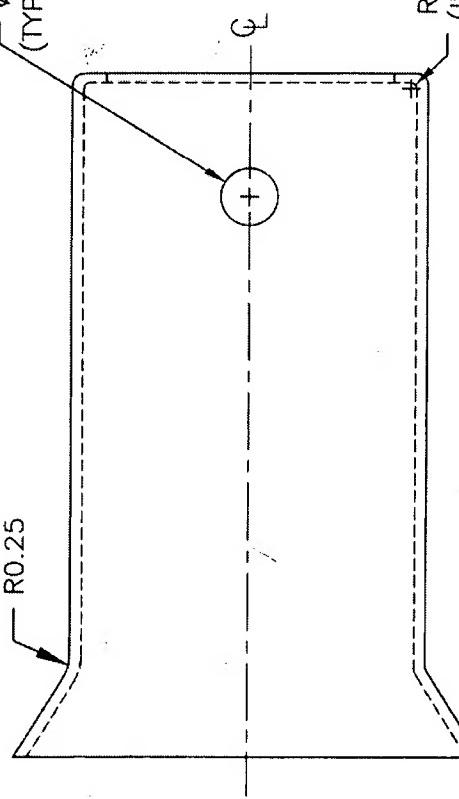
| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                  |                |                           |                        |                          |
|------|------|----------------------------------|-----------------------------|----------------------------------|----------------|---------------------------|------------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                  |                | Verification<br>Section C | Approval<br>Design Mgr | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Design Mgr       | Action Description<br>Design Mgr | Sign &<br>Date |                           |                        |                          |
|      |      |                                  |                             |                                  |                |                           |                        |                          |
|      |      |                                  |                             |                                  |                |                           |                        |                          |
|      |      |                                  |                             |                                  |                |                           |                        |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

NOTE: Date & initial all entries QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

**DART**DRAWN BY  
CP  
ISSUED

|         |           |                 |           |                    |                           |
|---------|-----------|-----------------|-----------|--------------------|---------------------------|
| DESIGN  | JB        | DRAWN BY        | CP        | DART AEROSPACE LTD | REV. A                    |
| CHECKED | <i>CH</i> | APPROVED        | <i>CH</i> | DRAWING NO.        | HAWKSLEY, ONTARIO, CANADA |
| DATE    | 00.11.13  | TITLE           | ASPIRATOR | SCALE              | 1:1                       |
| A       | 00.11.13  | NEW ISSUE       |           |                    |                           |
| A1      | 01.10.01  | 1.625 was 1.600 |           |                    |                           |

(Ø0.316  
(TYP 2 PLACES))

**RELEASED**  
00-11-20  
SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 27332

NOTES:

THIS PART MUST MATE WITH D2000-109  
MATERIAL: 1100-0 ALUMINUM (QQ-A-250/1) 0.063 THICK  
FINISH: NONE  
TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED

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# COPPER AND BRASS SALES

## MATERIAL TYPE

### ALUMINUM ALLOYS WITH LOW BERYLLIUM

#### PRODUCT DESIGNATION

2014 2024 2224 2324 7050 7075 7150 7175 7475  
ALUMEC 89 ALUMEC 99 QC-7

## "WARNING"

SMALL CHIPS, FINE TURNINGS AND DUST MAY IGNITE READILY. EXPLOSION POTENTIAL MAY BE PRESENT WHEN: DUST OR FINES ARE DISPERSED IN THE AIR; FINE, DUST OR MOLTEN ALUMINUM ARE IN CONTACT WITH CERTAIN METAL OXIDES; OR, CHIPS, FINES, DUST OR MOLTEN ALUMINUM ARE IN CONTACT WITH WATER OR MOISTURE. KEEP AWAY FROM IGNITION SOURCE. USE EXPLOSION-PROOF VENTILATION. KEEP MATERIAL DRY.

THIS PRODUCT CONTAINS BERYLLIUM AND COPPER. INHALING BERYLLIUM DUST OR FUMES MAY CAUSE CHRONIC BERYLLIUM DISEASE (CBD), A SERIOUS CHRONIC LUNG DISEASE IN SOME INDIVIDUALS. BERYLLIUM IS A CANCER HAZARD; OVER TIME CBD AND CANCER CAN BE FATAL, TARGET ORGAN IS PRIMARILY THE LUNG. INHALING LARGE AMOUNTS OF COPPER, MAGNESIUM OXIDE, MANGANESE OXIDE, AND ZINC OXIDE FUMES OR DUST MAY CAUSE METAL FUME FEVER WITH FLU-LIKE SYMPTOMS. CHRONIC OVEREXPOSURE TO COPPER MAY CAUSE THICKENING OF THE SKIN; AND SKIN, TEETH, AND HAIR DISCOLORATION. CHRONIC OVEREXPOSURE TO MANGANESE DUST CAN CAUSE CENTRAL NERVOUS SYSTEM DAMAGE, SCARRING OF THE LUNGS AND REPRODUCTIVE HARM IN MALES. TARGET ORGAN IS PRIMARILY THE LUNG, BUT REPEATED HIGH EXPOSURE CAN ALSO AFFECT THE LIVER. CHRONIC OVEREXPOSURE TO IRON OXIDE DUST/FUME MAY CAUSE LUNG SIDEROSIS. CHRONIC OVEREXPOSURE TO SILICON DUST CAN CAUSE CHRONIC BRONCHITIS. OVEREXPOSURE TO AMORPHOUS SILICA CAN CAUSE DRYING OF THE MUCOUS MEMBRANES OF THE EYES, NOSE, AND THROAT.

THIS PRODUCT ALSO CONTAINS NICKEL AND CHROMIUM COMPOUNDS. INHALATION OF NICKEL DUST OR FUME MAY RESULT IN INFLAMMATION OF THE RESPIRATORY TRACT AND CAUSE NASAL AND/OR LUNG CANCER. NICKEL HAS BEEN IDENTIFIED AS A POTENTIAL HUMAN CARCINOGEN. EXPOSURE TO CHROMIUM DUST OR FUME MAY CAUSE METAL FUME FEVER WITH FLU-LIKE SYMPTOMS AND KIDNEY AND LIVER DAMAGE. UNDER HIGH TEMPERATURES, HEXAVALENT CHROMIUM MAY BE PRODUCED, IF IN THE INSOLUBLE FORM, IT IS A CONFIRMED HUMAN CARCINOGEN. (CALIFORNIA PROPOSITION 65).

IF COATED WITH OIL, MAY CAUSE SKIN IRRITATION/DERMATITIS BY CONTACT. WELDING FUME IS LISTED AS A POSSIBLE CARCINOGENIC TO HUMANS.

READ THE ALUMINUM/ALUMINUM ALLOYS MATERIAL SAFETY DATA SHEET(MSDS) ON FILE WITH YOUR EMPLOYER BEFORE WORKING WITH THIS MATERIAL

- \* If processing or recycling produces particulate, use exhaust ventilation or other controls designed to prevent exposure to workers. Examples of such activities include melting, welding, grinding, abrasive sawing, sanding and polishing. Any activity which abrades the surface of this material can generate airborne particulate. Use respiratory protection (P100, quantitative fit testing required) if exposures exceed the permissible limits.
- \* The Occupational Safety and Health Administration (OSHA) have set mandatory limits on occupational exposures.
- \* Aluminum, in solid form and as contained in finished products presents no special health risk.
- \* Sold for manufacturing purposes only. This product can be recycled; contact your sales representative.

The Occupational Safety and Health Administration require employers to provide training in the proper use of this product.

For additional information, call or write to Copper and Brass Sales, 22355 West Eleven Mile Road, Southfield, MI 48034, telephone 248-233-5600, or visit our web site @ [www.copperandbrass.com](http://www.copperandbrass.com).

**1100 Aluminum Coil and Sheet****1100 Aluminum Coil and Sheet****Alloy Attributes**

- Commercially pure aluminum
- Low strength, but excellent corrosion resistance
- Unmatched in workability
- Good welding, brazing, and soldering

**Tempers**

- O - Annealed
- H14 - Strain hardened and stabilized to a 1/2 hard temper

**Shapes / Forms**

- Coil and Sheet

**Sizes/ Tolerances**

- Coil Thickness:  
O: .016, .020, .032, .040, .050, .063, .080, .090, .125, .190  
H14: .016, .020, .025, .032, .040, .050, .063, .125, .190
- Sheet Thickness:  
O: .020, .025, .032, .040, .050, .063, .080, .090, .125, .190  
H14: .016, .020, .025, .032, .040, .050, .063, .090, .125, .190, .249
- Sheet Width and Length: various sheet sizes; 36" and 48" wide coil
- Tolerances: (Please note - all domestic mills produce as half commercial tolerance on the minus side). Example- Alcoa .063 (48" wide) is +.000-.0035

| Material Thickness | 36" Wide | 48" Wide |
|--------------------|----------|----------|
| .016               | +.001    | +.0015   |
| .020/.025          | +.0015   | +.002    |
| .032               | +.002    | +.0025   |
| .040               | +.0025   | +.0035   |
| .050, .063         | +.003    | +.0035   |
| .071               | +.0035   | +.004    |
| .080, .090         | +.0035   | +.0045   |
| .100, .125         | +.0045   | +.006    |

Atm Arkt  
 Sheet mpc  
 (601) 530 - 7490

- Mexinox
- Thyssen-Krupp Nirosta
- Allegheny-Ludlum

### ***Mechanical Properties***

- Tensile (ultimate) strength, yield strength, elongation

| <u>Minimum<br/>Tensile</u> | <u>Minimum<br/>Yield</u> | <u>%<br/>Elongation</u> | <u>Rockwell<br/>Hardness</u> |
|----------------------------|--------------------------|-------------------------|------------------------------|
| 70,000 PSI                 | 25,000 PSI               | 40%                     | B95 Max                      |

### ***Physical Properties***

- Coefficient of Thermal Expansion: 9.4
- Electrical Conductivity: 74%
- Coefficient of Thermal Expansion: 10.3
- Weldability: Very good
- Formability: Good

### ***Nominal Chemical Composition***

- 0.03% maximum C
- 2% max Mn
- .75 % max Si
- 16-18% Cr
- 10-10.5% Ni
- 2-2.5% Mo
- Balance Fe

|            |       |       |
|------------|-------|-------|
| .160, .190 | +.007 | +.009 |
| .249       | +.012 | +.014 |

## Product Surface Finishes

- Mill Finish

## Dedicated Suppliers

- Alcoa
- Commonwealth Aluminum
- Offshore suppliers (various)

## Mechanical Properties

- Tensile (ultimate) strength, yield strength, elongation
- O Temper

| Tensile    | Modulus<br>of<br>Elasticity | Yield      | Shear<br>Strength | %<br>Elongation | Brinell<br>Hardness |
|------------|-----------------------------|------------|-------------------|-----------------|---------------------|
| 13,000 KSI | 10                          | 5,000 KSI  | 9,000<br>PSI      | 35%             | 23                  |
| • H14      |                             |            |                   |                 |                     |
| Tensile    | Modulus<br>of<br>Elasticity | Yield      | Shear<br>Strength | %<br>Elongation | Brinell<br>Hardness |
| 18,000 KSI | 10                          | 17,000 KSI | 11,000<br>PSI     | 9%              | 32                  |

## Physical Properties

- Coefficient of Thermal Expansion:  $13.1 \times 10^{-6}$  in/in/ $^{\circ}$ F
- Thermal Conductivity: 1540 BTU/Ft/Hr/Ft $^2$ / $^{\circ}$ F
- Nominal Density: .098 lb./in $^3$
- Electrical Conductivity: 59% IACS

## Nominal Composition

- .10% Cu
- 99.0% minimum aluminum